**Introduction**

This is the SmartTwo : my second DIY 3d printer.

**The SmartTwo Printer**

This is an FDM printer.

Main board is RAMPS 1.4 with Arduino, step motor driver Polulu A4988, display is RepRapDiscount Full Graphic Smart Controller.

Firmware is Marlin 1.1.

Step motors are Nema 17, 1.8ⷪ angle.

Hardware structure is aluminium v-slot 20x20 with 8mm gap.

Hotend is E3D-V6 12v 1.75mm filament, nozzle 0.4mm, Extruder is Gregs-Wade reloaded. Heated bed is model MK2 214x214mm 12v.

Printing area: 180(X) x 190(Y) x 160(Z).

Bed leveling with servo motor 9g.

The bed is moved in the X and Y axis. The extruder arm moves only on Z axis.

Linear rods to stabilize the axes .

**Lessons learned**

Some good ideas I’d like to keep in the SmartTwo Project:

* Bed leveling with servo motor 9g and microswitch
* Arduino 2560 with Ramps 1.4
* Marlin firmware
* Aluminium v-slot for the structure
* Fan to cool the printing object

Some mistakes I’d like to avoid:

* Z axis with Only one motor: results in to much vibration on the hotend
* Small print área
* Ramps Mosfet to power up heat bed: better use external Mosfet
* Linear rods: low precision, maintenance required
* Hair spray or glue at bed glass
* Step motor support built with PLA

Some improvements I’d like to try:

* New step motor drivers: DRV8825
* Octoprint at Raspberry Pi
* Dual extrusion
* Dual stepper motor to Z axis
* Marlin 2.0
* Pulley wheels running at v-slot
* Bolden MK8 extruder
* Runout filament sensor
* Auto nozzle cleaning